

additional power rings can be configured as a plurality of power ring segments. Additionally, the vias can be located at, or near, the center of the segmented power rings (e.g., 431) rather than at the edges.

[0033] Fig. 5 depicts a simplified schematic top down view of another implementation of a BGA package constructed in accordance with the principles of the invention. A front side of a substrate 501 is depicted. A die attachment region 502 is shown near the middle of the substrate 501. The substrate 501 includes a plurality of vias 510 that are used to facilitate electrical connections throughout the package. Also, depicted are a plurality of traces which are also used to facilitate electrical connections throughout the package. In particular, the traces 511 are used to supply electrical connections to I/O solder balls mounted on the back side (not shown in this view) of the package. Also depicted are a ground ring 520 and power rings. A first power ring formed of first power ring segments 531 is shown. Also depicted is a second power ring formed of second power ring segments 541. The depicted ring segments 531, 541 are arranged in staggered configuration with respect to each other. The depicted first ring segments 531 also include conductive tabs 532 that extend to associated vias 510. In the depicted embodiment, the conductive tabs 532 extend through the spaces between the second power ring segments 541. The depicted embodiment also shows that the endmost (and longer) first power ring segments 541 are supplied power through two vias 510. The reader is reminded that the illustrations and descriptions contained herein are descriptive of certain preferred embodiments of the invention and are not intended to limit the scope of the invention. Although depicted here as having 44 first and second power ring segments, embodiments having in the range of twenty to sixty power ring segments are well contemplated by the inventors. Alternatively, embodiments having fewer or more power ring segments are also contemplated by the inventors. Additionally, the inventors contemplate that the ground ring can be split into several segments. Such an implementation can provide, among other things, improved circuit isolation and reduced noise in systems of the die.